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tidal experts to determine the co-tidal curves for Lincoln Sea, and Robeson and Kennedy channels.

The temperature of the surface sea-water was carefully observed from October, 1882, to June, 1883. The temperature fell steadily from a mean of 29.2° in October, to 29° in December, and then rose steadily to 29.4° in June. The ebbing tide (to the north) was from 0.1° to 0.2° colder than the flowing tide, and its mean for December was 28.9° .

The sounding of 133 fathoms and no bottom, midway between Capes May and Britannia, is significant of a different ocean along the north coast of Greenland, from the shallow sea north of Asia, North America, and Grinnell Land.

Forty-eight swings, with accompanying time observations, were made with a pendulum furnished by the U. S. coast and geodetic survey. The observations are now in the hands of Assistant Charles S. Peirce for reduction and comparison. I regret that continued mental and physical weakness have prevented more careful and systematic treatment of these subjects. This summary is now presented, as the immediate future promises no better results from my hands. A. W. GREELY, U.S. army.

FOOTPRINTS IN THE ROCKS OF COLORADO.

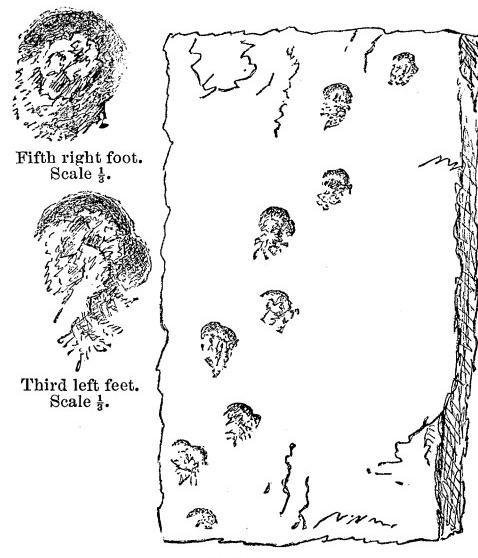
FROM a few tracks and signs, an Indian is said to have inferred that at noon there had passed by a white man, lame in the left foot, blind in the right eye, dressed in gray, and with a double-barrelled gun and a black dog. With no attempt to rival the aborigines, nor to name and classify, it is interesting to notice some features of the footprints on four slabs from St. Vrain Creek, Col., — the only vestiges of animal life thus far reported from the immense beds of triassic sandstones in the eastern Rocky Mountains. Three of the slabs are in the museum of Iowa college, Grinnell, Io.: the other, No. 2, has been sent to the national museum.

Slab No. 1, represented in the figure, with two of the tracks on a larger scale, is somewhat like the rare horseshoe forms found in Europe and in the Connecticut valley, in rocks of the same age. No hooved animal is supposed to have existed at so early a period. The shape has been attributed to a membrane beneath claws, in this case a firm, flat pad, if that be the explanation, and semicircular within as well as exteriorly. In the three forward tracks, the fore and hind feet coincided,

making one impression. In four of the remaining tracks, the smaller fore-feet show a crescent that coalesces with that of the hind-foot. There is a rough, *broken*, irregular bulging of the rock in and behind the hollow of the foot, dying away backward into the surface. The great amount of this would suggest that the animal was ascending a wet slope.

The appearance of slab No. 3 is so like No. 2 that they were probably one continuous series. As seen in the figure, the larger impression of the hind-foot mostly touches, and once or twice somewhat overlaps, that of the fore-foot, which is evidently such because its position varies relatively to the former. It has a wide angle from the line of progression. In the last (uppermost) left feet, the fore-foot repeats its print, though at first glance it looks like a jointed toe. All the impressions are simple ovals (ellipses), deepest in the centre; and several, as in the larger separate figure, have a shallow ear-shaped impression on the inner forward border, which, in two, shows slight lengthwise wrinkles. The left-side tracks are less perfect, as if the right feet pressed on a lower, wetter part of the ancient beach.

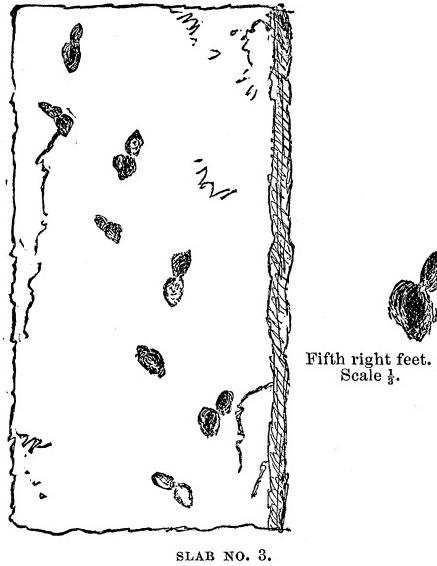
In No. 3 there was an inch space between the heels in passing each other; in No. 1, little



Average stride, $8\frac{1}{2}$ inches; width of trackway, $4\frac{1}{2}$ inches.
Scale, 1-12.

or none. The animals must therefore have had an erect habit, not the dragging movement, with horizontally extended legs, of ordinary reptiles, if reptiles they were.

Slab No. 4 has nine pairs of hind-foot tracks, with the fore-feet sometimes coinciding, and elsewhere separated at considerable distances. They are in relief, that is, on the under side



Average stride, 8 $\frac{1}{4}$ inches; width of trackway, 4 $\frac{1}{2}$ inches.
Scale, 1-12.

of the layer, and resemble Nos. 2 and 3, but smaller; and the stride is two inches less.

Thorough search was made among the vast quantities of waste stone in the main quarries, and also in those of Stone Cañon adjoining, as well as in the streets of Denver, where these red quartzitic sandstones are largely used for flagging. The scarcity of the tracks is emphasized by the abundance of raindrop impressions. There were also many irregular stellate moulds, left by some crystallization, which a quarryman mistook for tracks.

H. W. PARKER.

SUCCESSFUL EXTRACTION OF A BULLETP FROM THE BRAIN.

THE *New-York medical journal* of March 28 gives an account of an interesting surgical operation recently performed in New York, from which we condense the following statement:—

On the 24th of January, 1884, a healthy young man, Bruno Knorr, nineteen years old, was admitted into one of the wards at Bellevue hospital, suffering from a pistol-shot wound penetrating the brain through the centre of the forehead. The patient was semi-unconscious, and when aroused was irritable, and in answer to all questions simply grunted

'ja.' It was thus impossible to ascertain the circumstances of the occurrence of the injury. It has since, however, been learned from the patient, that, while lying upon his back, he shot himself with a pistol held in contact with his forehead. There was complete loss of motion without loss of sensation on the right side of the body, below the head. There was increased sensitiveness on the left side, which was very marked upon the left side of the scalp near the ear.

Preparatory to the operation, the patient's scalp was shaved. He was then etherized. A flap of gutta-percha tissue was fastened to his forehead to protect his eyes from the antiseptic solution used.

The bullet-hole in the skull, which was about half an inch in diameter, was then enlarged with a Ronguer forceps; but during the process a small clot was disturbed, which gave rise to arterial bleeding from beneath a depressed fragment of the skull whose sharp, convex edge had been driven into the brain. Upon the removal of this fragment the arterial hemorrhage was alarmingly profuse, and it became evident that the patient would speedily bleed to death unless it could be stopped.

After many unsuccessful attempts, Dr. Fluhrer succeeded in catching the artery with a Langenbeck's artery-forceps, and, while he held the instrument, an assistant attempted to tie the vessel. Unfortunately, during the process the delicate artery was torn, and it was found impossible to reach the remaining portion without removing another piece of the skull which covered it. In the mean time, the hemorrhage was so great as to threaten the patient's life. This was partially arrested by an assistant, who passed his finger through the opening in the skull, and compressed the artery against the brain, while Dr. Fluhrer removed a disk of bone sufficiently large to enable the artery to be reached with a Pean's forceps. With the aid of two pairs of dissecting-forceps, he succeeded in passing a silk ligature around the artery, and tying it. Upon the removal of the Pean's forceps, however, the pulsations of the artery and brain loosened and threw off the ligature, so that the bleeding became as profuse as before. The vessel from which the blood flowed was found to have been severed near its junction with a large artery, which Dr. Fluhrer now seized below the point of bifurcation. He saw clearly that the short branch could not be tied; and fearing that the slightest movement of the patient's head might tear the delicate vessel from the forceps, and cause an inevitably fatal hemorrhage, he transferred the artery to the grasp of the short and light clamp shown in fig. 1, which could lie in the wound with-



FIG. 1.—SMALL ARTERY CLAMP, ACTUAL SIZE.

out risk of detachment. No further attempt was made to ligature the artery, and the metallic clamp was left in the brain for many days. Two and a half hours had been spent in reaching this stage of the operation. Having arrested the hemorrhage, Dr.